

## AMENDED SPECIFICATION

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# PATENT SPECIFICATION

NO DRAWINGS



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841.074

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## COMPLETE SPECIFICATION

## Improvements in and relating to the Treatment of Tobacco and to Cigarettes made with Tobacco so Treated

We, JOHNSON, MATTHEY & COMPANY LIMITED, a British Company, of 78, Hatton Garden, London, E.C.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in and relating to the treatment of smoking tobacco for cigars, cigarettes and/or tobacco pipes and to cigarettes or other paper wrapped smoking products made with tobacco so treated.

At the present time the public is being made increasingly aware of the dangers inherent in the inhalation of tobacco smoke, particularly in its relationship to the increasing incidence of lung cancer.

Although it has not yet definitely been established beyond refutation that the inhalation of tobacco smoke in considerable quantities will invariably cause lung cancer, statistical researches carried out by competent bodies, such as the British Medical Research Council, have undoubtedly shown that a relationship does exist such that heavy smokers are more liable to suffer from the dire effects of this disease than are occasional or non-smokers.

Moreover, it has also been established that cigarette smoke contains small quantities of compounds such as benz-pyrene, which are carcinogenically active, but the relative importance or otherwise of the compounds, from the carcinogenic point of view, has yet to be

determined.

Nevertheless, in view of the disquiet engendered in the mind of the public by recent disclosures, it is clearly desirable to find a means of eliminating from tobacco smoke the actually or potentially dangerous ingredients before they are inhaled into a smoker's lungs.

It is known that active carcinogens consist mainly of complex organic compounds, such as benz-pyrene, with or without branch-chain or oxygen-containing appendages in their constituent molecules. The carcinogenic property of such compounds is known to be highly specific to their molecular structure and any alteration in this structure, e.g. an oxidation or breaking down of this structure, will destroy this property.

The principal object of this invention is to render innocuous or substantially innocuous the products of combustion resulting from the burning of pipe, cigar or cigarette tobacco.

Another object of this invention is to provide a novel method for the treatment of cigarette or pipe tobacco or of paper wrapped smoking products made therewith which shall have the effect of eliminating from the products of combustion any compounds having, or likely to have, dangerous carcinogenic activity or of radically reducing the concentration of such compounds.

According to the invention, a method of treating smoking tobacco for cigars, cigarettes or tobacco pipes, for the purposes above set forth, comprises applying to said tobacco a metallic catalyst-forming material consisting of

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one or more chlorine-free water-soluble and decomposable platinum group metal compounds.

By "platinum group metal," as used herein, is meant platinum, palladium, rhodium, osmium, iridium or ruthenium.

The catalyst-forming material may be applied to the tobacco to be treated in any suitable and convenient manner. For example, the tobacco may be impregnated, by spraying or dipping, with a solution of the catalyst-producing material in a volatile solvent such, for example, as water or ether.

The amount of catalyst-forming compound used is not thought to be critical and it will be found in practice that an amount of the order of 0.1% by weight of platinum group metal based on the dry weight of the tobacco will be satisfactory in most cases.

The advantageous effect of the presence of the platinum group metal catalyst-forming compound, in accordance with our invention, will, it is thought, be readily appreciated. When the tobacco, impregnated with the catalyst material, is lighted, the hot vapours from the combustion zone will come into intimate contact with the catalyst material, which has been converted to metallic form under the action of the heat engendered, the presence of excess oxygen being assured by the action of "drawing" on the pipe, cigar or cigarette. Owing to the presence of the catalyst, any carcinogenic compounds present in the combustion products will undergo catalytic oxidation, degradation or molecular rearrangement and thereby be rendered carcinogenically inactive and harmless.

Although in carrying out our invention, any chlorine-free soluble and heat-decomposable compound of any platinum group metal or a mixture of two or more such compounds may be used, we prefer to use platinum as the catalyst metal and have found that effective results may be obtained by the use of platinum di-ammino nitrite, which is advantageously applied by spraying in the form of an aqueous solution of the compound.

Other platinum compounds which may be used in carrying out the invention are:

- (1). Platino nitrate or nitrite of sodium, potassium or ammonia.
- (2). Hexamine platino nitrate or nitrite.
- (3). Hexa-hydroxy platinate of sodium, potassium or ammonia.
- (4). Platinum amino-nitrates or nitrites of sodium, potassium or ammonia.
- (5). Platinum ammino or amine nitrates or nitrites.

The corresponding compounds of the other platinum group metals may also be employed.

The above examples are representative only of numerous platinum group metal compounds which will be found suitable for use in accordance with the invention and are not in any way intended to be exhaustive.

The beneficial effects and advantages of the invention are illustrated in and by the following experiment, given solely by way of example.

Tobacco from a batch intended for use in the manufacture of cigarettes was impregnated or coated by spraying with an aqueous solution of platinum di-ammino nitrite in amount to provide 0.1% of platinum based on the dry weight of the tobacco. The so-treated tobacco was then made up into cigarettes in the usual manner. The cigarettes were then burned and the tarry residue collected.

A similar number of cigarettes was then made up from tobacco from the same batch, which, however, had not been treated in accordance with the invention. These cigarettes were also burned and the tarry residue collected.

Tests were then carried out on the two residues to ascertain the benz-pyrene content thereof and it was found that the amount of this compound present in the residue derived from the treated tobacco was 60% less than that in the residue from the untreated tobacco.

It is to be understood that the invention is intended to include within its scope pipe, cigar or cigarette tobacco when treated in accordance with the method of this invention, or cigarettes or other paper wrapped smoking products, the tobacco of which has been so treated.

#### WHAT WE CLAIM IS:—

1. A method of treating smoking tobacco for cigars, cigarettes or tobacco pipes for the purposes hereinbefore set forth which comprises applying to said tobacco a metallic catalyst-forming material consisting of one or more chlorine-free water-soluble and heat decomposable platinum group metal compounds.
2. A method as claimed in claim 1 wherein the tobacco is impregnated with a solution of the compound in a volatile solvent, such as water.
3. A method as claimed in claim 2 wherein the solution is sprayed on to the tobacco.
4. A method as claimed in claim 2, wherein the tobacco is dipped in the solution.
5. A method as claimed in any of the preceding claims wherein a solution of a decomposable compound of platinum in a volatile solvent is used.
6. A method as claimed in claim 5 wherein the decomposable compound of platinum consists of platinum di-ammino nitrite.
7. A method as claimed in any of the preceding claims wherein the compound is applied to the tobacco in an amount to provide about 0.1% by weight of platinum group metal.
8. The method of treating smoking tobacco for cigars, cigarettes or tobacco pipes substantially as hereinbefore described with reference to the foregoing example.
9. Smoking tobacco for cigars, cigarettes or tobacco pipes, when treated by the method

claimed in any of the preceding claims.

10. A method as claimed in claim 1 wherein two or more platinum group metal compounds are employed in combination to form the catalyst.

11. Cigars or cigarettes, the tobacco of

which has been treated by the method claimed in any of claims 1 to 8.

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# PROVISIONAL SPECIFICATION

## Improvements in and relating to the Manufacture and/or Treatment of Tobacco and/or of Cigarettes made therefrom

We, JOHNSON, MATTHEY & COMPANY LIMITED, a British Company, of 78, Hatton Garden, London, E.C.1, do hereby declare this invention to be described in the following statement:—

This invention relates to improvements in and relating to the manufacture and/or treatment of smoking tobacco for cigars and/or cigarettes and/or pipes and/or to the treatment of cigarettes made therefrom.

At the present time the public is being made increasingly aware of the dangers inherent in the inhalation of tobacco smoke, particularly in its relationship to the increasing incidence of lung cancer.

Although it has not yet definitely been established beyond refutation that the inhalation of tobacco smoke in considerable quantities will invariably cause lung cancer, statistical researches carried out by competent bodies, such as the British Medical Research Council, have undoubtedly shown that such a relationship does exist and that heavy smokers are more liable to suffer from the dire effects of this disease than are occasional or non-smokers.

Moreover, it has also been established that cigarette smoke contains small quantities of compounds such as benz-pyrene, which are carcinogenically active, but the relative importance or otherwise of the compounds, from the carcinogenic point of view, has yet to be determined.

Nevertheless, in view of the disquiet engendered in the mind of the public by the recent disclosures, it is clearly desirable to find a means of eliminating from tobacco smoke the actually or potentially dangerous ingredients before it is inhaled into a smoker's lungs.

It is known that active carcinogenic compounds consist mainly of large molecular-weight polynuclear hydrocarbons, such as benz-pyrene, with or without branch-chain or oxygen-containing appendages in their constituent molecules. The carcinogenic property of such compounds is known to be highly specific to their molecular structure and any alteration in this structure, e.g. an oxidation or breaking down of this structure, will destroy this property.

The object of this invention, therefore, is to provide a novel method for the treatment of

cigarette or pipe tobacco or of cigarettes made therefrom which shall have the effect of eliminating from the products of combustion any compounds having, or likely to have, dangerous carcinogenic activity or of reducing the concentration of such compounds to a safe minimum.

With this object in view, according to the broadest aspect of the invention, tobacco intended for pipe, cigar or cigarette smoking and/or, in the case of cigarettes, the combustible paper surrounding the tobacco, is treated by impregnation, coating or otherwise with a metallic catalyst, or catalyst-producing compound, comprising a platinum group metal or an alloy of two or more platinum group metals or one or more reducible platinum group metal compounds capable of forming such a catalyst under the action of heat.

By "platinum group metal," as used herein, is meant platinum, palladium, rhodium, osmium, iridium or ruthenium.

The catalyst metal or catalyst forming material may be applied to the tobacco to be treated in any suitable and convenient manner. For example, comminuted particles of catalyst in metallic form may be dusted on to the tobacco or a solution of a suitable compound of the catalyst metal in a volatile solvent such as water or ether may be sprayed on to the tobacco. If desired, the tobacco may be dipped in a solution of the chosen compound in a volatile solvent.

The amount of catalyst used is not thought to be critical and it will be found in practice that an amount of the order of 0.1% by weight of platinum group metal based on the weight of the tobacco will be satisfactory in most cases.

Whilst any of the platinum group metals may be used in carrying out our invention, we have a preference for the use of platinum owing to its known efficiency in catalytic oxidation processes. If desired, an alloy of two or more platinum group metals or a mixture of the compounds of two or more such metals may be used.

The advantageous effect of the presence of the platinum group metal catalyst, in accordance with our invention, will, it is thought, be readily appreciated. When the tobacco,

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5 impregnated with the catalyst material, is  
lighted, the hot vapours from the combustion  
zone will come into intimate contact with the  
catalyst material, which was either initially  
in metallic catalyst form or has been converted  
to such form under the action of the heat  
engendered, the presence of excess oxygen  
being assured by the action of "drawing" on  
the pipe, cigar or cigarette. Owing to the pre-  
10 sence of the catalyst, any carcinogenic com-  
pounds present in the combustion products will  
undergo catalytic oxidation, degradation or  
molecular rearrangement and thereby be  
rendered carcinogenically inactive and harm-  
15 less.

In the case where the invention is to be  
applied to cigarettes, it may be found advan-  
tageous also to impregnate the cigarette paper

with the catalyst metal or catalyst-forming  
compound. Or, again, it may in certain cases  
be found sufficient to impregnate or coat only  
the cigarette paper with catalyst material in  
accordance with the invention, whilst leaving  
the tobacco unaffected.

It is to be understood that the invention  
is intended to include within its scope pipe,  
cigar or cigarette tobacco when treated in  
accordance with the method of this invention,  
or cigarettes, the tobacco and/or the paper  
covering of which has been so treated.

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